

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. **PCT/EP 03 / 06994**

01 JUL 2003
International Filing Date

(01.07.2003)

EUROPEAN PATENT OFFICE
PCT INTERNATIONAL APPLICATION
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) 0000053815

Box No. I	TITLE OF INVENTION NUCLEIC ACID SEQUENCES ENCODING PROTEINS ASSOCIATED WITH ABIOTIC STRESS RESPONSE	
Box No. II	APPLICANT <input type="checkbox"/> This person is also inventor Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) BASF Plant Science GmbH 67056 Ludwigshafen Germany Telephone No. 0621/60-73919 Facsimile No. 0621/60-52538 Teleprinter No. Applicant's registration No. with the Office	
State (that is, country) of nationality: DE		State (that is, country) of residence: DE
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Box No. III	FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) CHARDONNENS, Agnes Edelweißstr. 40 13158 Berlin Germany 1		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.) Applicant's registration No. with the Office
State (that is, country) of nationality: NL		State (that is, country) of residence: DE
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.		
Box No. IV	AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:		<input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Dres. Fitzner, Münch & Kluin Rechts- und Patentanwälte Lintorfer Str. 10 40878 Ratingen Germany		Telephone No. 0-02102-42370 Facsimile No. 0-02102-46851 Teleprinter No. Agent's registration No. with the Office
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.		

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)*If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

PUZIO, Piotr
Edeltrautweg 21
13505 Berlin

Germany
2

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☒ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

☐ applicant only☐ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

☐ applicant only☐ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

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This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

☐ applicant only☐ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No. V DESIGNATION OF STATES Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republik of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, HU Hungary, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, RO Romania, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI-Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinean Rep., GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> OM Oman |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> PH Philippines |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> BZ Belize | <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> LR Liberia | <input checked="" type="checkbox"/> TN Tunisia |
| <input checked="" type="checkbox"/> CO Colombia | <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> LT Lithuania | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> LU Luxembourg | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> LV Latvia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> MA Morocco | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> MD Republic of Moldova | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> MG Madagascar | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> VC St. Vincent |
| <input checked="" type="checkbox"/> EC Ecuador | <input checked="" type="checkbox"/> MN Mongolia | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> MW Malawi | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> MX Mexico | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> MZ Mozambique | <input checked="" type="checkbox"/> ZM Zambia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> NI Nicaragua | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> NO Norway | |
| <input checked="" type="checkbox"/> GE Georgia | | |
| <input checked="" type="checkbox"/> GH Ghana | | |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

- | | | |
|--|--|--------------------------------|
| <input type="checkbox"/> SC Seychelles | <input type="checkbox"/> SY Syrian Arab Republic | <input type="checkbox"/> |
| <input type="checkbox"/> PG Papua New Guinea | <input type="checkbox"/> | <input type="checkbox"/> |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 07 August 2002 (07.08.2002)	02017671.5		EP	
item (2)				
item (3)				
item (4)				
item (5)				
item (6)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items
 ☐ item (1)
 ☐ item (2)
 ☐ item (3)
 ☐ item (4)
 ☐ item (5)
 ☐ other, see Supplemental Box

*Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

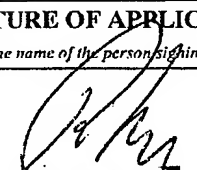
Date (day/month/year) Number Country (or regional Office)

Box No. VIII DECLARATIONS

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of
declarations

- | | | |
|---|--|---|
| <input type="checkbox"/> Box No. VIII (i) | Declaration as to the identity of the inventor | : |
| <input type="checkbox"/> Box No. VIII (ii) | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | : |
| <input type="checkbox"/> Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> Box No. VIII (iv) | Declaration of inventorship (only for the purposes of the designation of the United States of America) | : |
| <input type="checkbox"/> Box No. VIII (v) | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | : |

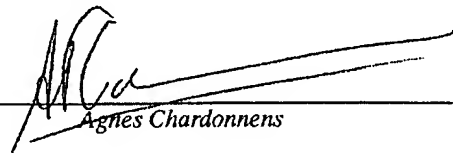
Box No. IX CHECK LIST; LANGUAGE OF FILING		
<p>This international application contains:</p> <p>(a) the following number of sheets in paper form:</p> <p>request (including declaration sheets) : 6</p> <p>description (excluding sequence listing part) : 79</p> <p>claims : 8</p> <p>abstract : 1</p> <p>drawings : 7</p> <p>Sub-total number of sheets: 101</p> <p>sequence listing part of description (<i>actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below</i>) : 45</p> <p>Total number of sheets : 146</p> <p>(b) sequence listing part of description filed in computer readable form</p> <p>(i) <input type="checkbox"/> only (under Section 801(a)(i))</p> <p>(ii) <input checked="" type="checkbox"/> in addition to being filed in paper form (under Section 801(a)(ii))</p> <p>Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (<i>additional copies to be indicated under item 9(ii), in right column</i>):</p> <p style="text-align: center;">disc</p>	<p>This international application is accompanied by the following item(s) (<i>mark the applicable check-boxes below and indicate in right column the number of each item</i>):</p> <p>1. <input checked="" type="checkbox"/> fee calculation sheet : 1</p> <p>2. <input type="checkbox"/> original separate power of attorney :</p> <p>3. <input type="checkbox"/> original general power of attorney :</p> <p>4. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: : 1</p> <p>5. <input type="checkbox"/> statement explaining lack of signature :</p> <p>6. <input checked="" type="checkbox"/> priority document(s) identified in Box No. VI as item(s): : 1</p> <p>7. <input type="checkbox"/> translation of international application into (language): :</p> <p>8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material :</p> <p>9. <input checked="" type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other))</p> <p>(i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) :</p> <p>(ii) <input type="checkbox"/> (<i>only where check-box (b)(i) or (b)(ii) is marked in left column</i>) addition copies including, where applicable, the copy for the purposes of international search under Rule 13ter :</p> <p>(iii) <input checked="" type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column :</p> <p>10. <input type="checkbox"/> other (<i>specify</i>): :</p>	<p>Number of items</p>
<p>Figure of the drawings which should accompany the abstract:</p>	<p>Language of filing of the international application: <i>english</i></p>	
<p>Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE</p> <p><i>Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).</i></p>		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  Dr. Dr. Uwe Fitzner Rechtsanwalt / Patentanwalt </div> <div style="text-align: right;"> <p>For Signatures of further inventors, see last or penultimate page</p> </div> </div>		
For receiving Office use only		
<p>1. Date of actual receipt of the purported international application:</p>	<p>(01.07.03) 01 JUL 2003</p>	<p>2. Drawings:</p> <p><input checked="" type="checkbox"/> received:</p> <p><input type="checkbox"/> not received:</p>
<p>3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:</p>		
<p>4. Date of timely receipt of the required corrections under PCT Article 11(2):</p>		
<p>5. International Searching Authority (if two or more are competent): <i>ISA/</i></p>	<p>6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid</p>	
For International Bureau use only		
<p>Date of receipt of the record copy by the International Bureau:</p>		

to Box No. III

Inventor is/are employee(s) of the Metanomics GmbH & Co. KGaA, Tegeler Weg 33,
10589 Berlin-Charlottenburg, Deutschland;

to Box No. X

further signatures



Agnes Chardonens

Piotr Puzio

Piotr Puzio



Further applicants and/or (further) inventors are indicated on another continuation sheet.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

DRES. FITZNER, MÜNCH & KLUIN
Linterfer Strasse 10
D-40878 Ratingen
GERMANY

INVITATION TO PAY ADDITIONAL FEES

(PCT Article 17(3)(a) and Rule 40.1)

REGISTERED

<p>Date of mailing (day/month/year) 21/11/2003</p>	<p>Applicant's or agent's file reference 0000053815 NAC 1003/01 EPC</p>
<p>Applicant BASF PLANT SCIENCE GMBH</p>	<p>Payment Due within 30 days days from the above date of mailing</p>
<p>International application No. PCT/EP 03/06994</p>	<p>International filing date (day/month/year) 01/07/2003</p>

1. This International Searching Authority

- (i) considers that there are 25 (number of) inventions claimed in the international application covered by the claims indicated ~~XXXX~~ on the extra sheet:

and it considers that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3) for the reasons indicated ~~XXXX~~ on the extra sheet:

- (ii) ☒ has carried out a partial international search (see Annex) ☐ will establish the international search report on those parts of the international application which relate to the invention first mentioned in claims Nos.:

1-20 and 29-50 all partially

- (iii) will establish the international search report on the other parts of the international application only if, and to the extent to which, additional fees are paid

2. The applicant is hereby invited, within the time limit indicated above, to pay the amount indicated below:

EUR 945,00	x	24	=	EUR 22.680,00
Fee per additional invention		number of additional inventions		total amount of additional fees

Or, _____ x _____ = _____

The applicant is informed that, according to Rule 40.2(c), the payment of any additional fee may be made under protest, i.e., a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive.

3. ☐ Claim(s) Nos. _____ have been found to be unsearchable under Article 17(2)(b) because of defects under Article 17(2)(a) and therefore have not been included with any invention.

<p>Name and mailing address of the International Searching Authority</p> <p> European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016</p>	<p>Authorized officer</p> <p style="text-align: center;">Joannes Vergoosen</p>
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This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1: claims 1-20, and 29-50 all partially

Transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on SEQ ID NOS:1 and further uses thereof to as markers and for preparing plant cells

Inventions 2-7: claims 1-20,
and 29-50 all partially

Transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on uneven SEQ ID NOS:3-13 and further uses thereof to as markers and for preparing plant cells, where each invention is defined by a single sequence starting with invention 2, SEQ ID NOS:3 through to invention 7, SEQ ID NOS:13.

Inventions 8-12: claims 1-50 all partially

Oxidoreductase stress related proteins and nucleic acids, and transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on uneven SEQ ID NOS:15-23 and corresponding even SEQ ID NOS:16-24 and further uses thereof as markers and for preparing plant cells, where each invention is defined by a sequence pair starting with invention 8, SEQ ID NOS:15 and 16 through to invention 12, SEQ ID NOS:23 and 24

Inventions 13-21: claims 1-20,
and 29-50 all partially

Transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on uneven SEQ ID NOS:25-41 and further uses thereof to as markers and for preparing plant cells, where each invention is defined by a single sequence starting with invention 13, SEQ ID NOS:25, through to invention 21, SEQ ID NO:41.

Invention 22: claims 1-24 and 29-50 all partially

Oxidoreductase stress related protein and transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on SEQ ID NOS:43 and 44 and further uses thereof as markers and for preparing plant cells.

Invention 23: Claims 1-20 and 25-50 all partially

Oxidoreductase stress related protein encoding nucleic acid and transgenic plant cells, plants, expression vectors, methods

for producing plants, producing stress tolerance based on SEQ ID NOS:45, and further uses thereof as markers and for preparing plant cells.

Invention 24: Claims 1-20, and 29-50 all partially

Transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on SEQ ID NO:47 and further uses thereof as markers and for preparing plant cells

Invention 25: claims 1-50 all partially

Oxidoreductase stress related proteins and nucleic acids, and transgenic plant cells, plants, expression vectors, methods for producing plants, producing stress tolerance based on SEQ ID NOS:49 and corresponding SEQ ID NO:50 and further uses thereof as markers and for preparing plant cells.

Environmental stress tolerant plants expressing oxidoreductase stress related protein(ORSRP) encoding transgenes, including thioredoxin and glutaredoxin, have been disclosed in D1, D2, D4, and D5-D7 (thioredoxin/glutaredoxin). Yeast glutaredoxin genes and their use to confer oxidative stress tolerance have been disclosed in D3. Furthermore a plant glutaredoxin sequence has been disclosed in D8.

The abovementioned technical features disclosed in D1-D8 can no longer be regarded as special i.e. providing a common contribution over the state of the art shared by the whole claimed subject matter within the meaning of Rule 13.2 PCT. In view of the prior art the problems underlying the present application is defined as provision of alternative stress tolerant plants and provision of alternative ORSRP (glutaredoxin/thioredoxin) sequences and their use in conferring stress tolerance. The claimed solutions, as defined by invention groups 1-25, involve the use of known sequences and new ones as defined by the corresponding SEQ ID NOS. mentioned in the claims.

In view of the prior art regarding environmental stress tolerant transgenic plants expressing oxidoreductase stress related protein(ORSRP) encoding transgenes (including thioredoxin and glutaredoxin), the yeast glutaredoxin genes and their use to confer oxidative stress tolerance, plant glutaredoxin, and considering the essential differences in the primary structure of the claimed sequences and since the examining division can find no further features that may be regarded as special that provide a technical relationship common to all the solutions that link the claimed inventions so as to form a single inventive concept, as required by Rule 13.1 PCT, there is a lack of unity and the different inventions not belonging to a common inventive concept have been formulated as different subjects in the

INVITATION TO PAY ADDITIONAL FEES

International application No.

PCT/EP 03/06994

communication pursuant to Art. 17(3)(a)PCT.

**Annex to Form PCT/ISA/206
COMMUNICATION RELATING TO THE RESULTS
OF THE PARTIAL INTERNATIONAL SEARCH**

International Application No
PCT/EP 03/06994

1. The present communication is an Annex to the invitation to pay additional fees (Form PCT/ISA/206). It shows the results of the international search established on the parts of the international application which relate to the invention first mentioned in claims Nos.:
- see 'Invitation to pay additional fees'
2. This communication is not the international search report which will be established according to Article 18 and Rule 43.
3. If the applicant does not pay any additional search fees, the information appearing in this communication will be considered as the result of the international search and will be included as such in the international search report.
4. If the applicant pays additional fees, the international search report will contain both the information appearing in this communication and the results of the international search on other parts of the international application for which such fees will have been paid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ROXAS VIRGINIA P ET AL: "Stress tolerance in transgenic tobacco seedlings that overexpress glutathione S-transferase/glutathione peroxidase." PLANT AND CELL PHYSIOLOGY, vol. 41, no. 11, November 2000 (2000-11), pages 1229-1234, XP008012998 ISSN: 0032-0781 the whole document	1-20, 29, 30, 32-35, 37-44, 47, 48
X	MCKERSIE BRYAN D ET AL: "Water-deficit tolerance and field performance of transgenic alfalfa overexpressing superoxide dismutase." PLANT PHYSIOLOGY (ROCKVILLE), vol. 111, no. 4, 1996, pages 1177-1181, XP002229168 ISSN: 0032-0889 cited in the application	1-20, 29, 30, 32-35, 37-44, 47, 48
Y	the whole document ---	31, 36
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	COLLINSON EMMA J ET AL: "The yeast glutaredoxins are active as glutathione peroxidases." JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 277, no. 19, 10 May 2002 (2002-05-10), pages 16712-16717, XP002229169 May 10, 2002 ISSN: 0021-9258 the whole document ---	31,36
X	WO 99 04013 A (FALAK IGOR ;NAZARIAN KATHERINE A P (CA); PIONEER HI BRED INT (US);) 28 January 1999 (1999-01-28) page 32, line 24 - line 30; claims 1,5 ---	1-20,29, 30, 32-35, 37-44, 47,48
X	WO 00 49165 A (PIONEER HI BRED INT ;TARCZYNSKI MITCHELL C (US); LEUSTEK THOMAS (U) 24 August 2000 (2000-08-24) page 2, line 9 - line 13 page 3, line 20 - line 26 page 4, line 5 - line 22; claim 33 ---	1-20, 29-44, 47,48
X	WO 00 63417 A (UNIV CALIFORNIA) 26 October 2000 (2000-10-26) claim 60; example 2 ---	1-20, 29-44, 47,48
X	WO 02 053589 A (DE VEYLDER LIEVEN ;FRANKARD VALERIE MARIE-NOELLE (BE); INZE DIRK () 11 July 2002 (2002-07-11) page 9, line 5 - line 11 page 12, line 19 - line 24 page 14, line 5 - line 24 page 24, line 25 - line 32 page 32, line 15 - line 19 page 61, line 3 - line 23 page 68 -page 74 page 106, line 25 - line 35; claims 37,38 ---	1-20, 29-44, 47,48
X	BROIN MELANIE ET AL: "The plastidic 2-cysteine peroxiredoxin is a target for a thioredoxin involved in the protection of the photosynthetic apparatus against oxidative damage." PLANT CELL, vol. 14, no. 6, June 2002 (2002-06), pages 1417-1432, XP002229170 June, 2002 ISSN: 1040-4651 the whole document ---	1-20, 29-44, 47,48
	-/--	

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 58453 A (CHO MYEONG JE ;MARX CORINA (US); WONG JOSHUA (US); BUCHANAN BOB B) 5 October 2000 (2000-10-05) page 7, line 31 - line 34 page 13, line 30 - line 31 page 40, line 25 -page 41, line 6 ---	1-20, 29-44, 47,48
X	LEE KYUN OH ET AL: "Rice lCys-peroxiredoxin over-expressed in transgenic tobacco does not maintain dormancy but enhances antioxidant activity." FEBS LETTERS, vol. 486, no. 2, 2000, pages 103-106, XP004337821 ISSN: 0014-5793 the whole document ---	1-20,29, 30, 32-35, 37-44, 47,48
X	WO 00 14239 A (THORPE CATHERINE J ;DU PONT (US); LU ALBERT L (US); ALLEN STEPHEN) 16 March 2000 (2000-03-16) the whole document ---	1-20, 29-33, 47,48
X	WO 00 36126 A (NOVARTIS ERFIND VERWALT GMBH ;NOVARTIS AG (CH); LANAHAN MICHAEL B) 22 June 2000 (2000-06-22) the whole document ---	1-20, 29-33, 47,48
L	BICK ET AL: "Glutaredoxin function for the carboxyl-terminal domain of the plant-type 5'-adenylylsulfate reductase" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 95, July 1998 (1998-07), pages 8404-8409, XP002122450 ISSN: 0027-8424 shows the glutaredoxin actiivty of the APS enzyme disclosed in W00049165 the whole document ---	1-20, 29-41, 47,48
A	MINAKUCHI KAZUNOBU ET AL: "Cloning and sequence analysis of a cDNA encoding rice glutaredoxin." FEBS (FEDERATION OF EUROPEAN BIOCHEMICAL SOCIETIES) LETTERS, vol. 337, no. 2, 1994, pages 157-160, XP002229171 ISSN: 0014-5793 the whole document -----	

Patent Family Annex

Information on patent family members

International Application No


PCT/EP 03/06994

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9904013	A	28-01-1999	AU 8411198 A WO 9904013 A2 ZA 9806308 A	10-02-1999 28-01-1999 24-11-1999
WO 0049165	A	24-08-2000	US 6576819 B1 AU 3702700 A EP 1153135 A1 WO 0049165 A1	10-06-2003 04-09-2000 14-11-2001 24-08-2000
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WO 0036126	A	22-06-2000	AU 1980300 A BR 9916212 A CA 2353794 A1 CN 1330720 T WO 0036126 A1 EP 1141352 A1 HU 0104690 A2 JP 2002532097 T PL 349512 A1 TR 200101767 T2 ZA 200104655 A	03-07-2000 11-09-2001 22-06-2000 09-01-2002 22-06-2000 10-10-2001 28-03-2002 02-10-2002 29-07-2002 21-11-2001 19-08-2002

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

<p>To:</p> <p>DRES. FITZNER, MÜNCH & KLUIN Linterfer Strasse 10 D-40878 Ratingen GERMANY</p>	<p>B'arb.: <i>R. Filut</i></p> <p>18. Dez. 2003</p> <p>VFrist: _____</p> <p>Vfg: _____</p>	<p><i>18.12.03</i></p> <p>COMMUNICATION IN CASES FOR WHICH NO OTHER FORM IS APPLICABLE</p>
		<p>Date of mailing (day/month/year) 16/12/2003</p>
<p>Applicant's or agent's file reference</p> <p>0000053815 <i>NAE 1003/01 PCT</i></p>		<p>REPLY DUE</p> <p>See paragraph 1 below</p>
<p>International application No.</p> <p>PCT/EP 03/06994</p>		<p>International filing date (day/month/year) 01/07/2003</p>
<p>Applicant</p> <p>BASF PLANT SCIENCE GMBH.</p>		
<p>1. <input type="checkbox"/> REPLY DUE within _____ 1000 days from the above date of mailing</p> <p><input checked="" type="checkbox"/> NO REPLY DUE</p> <p>2. COMMUNICATION:</p> <p>While inspecting the file for a.m. International Application this International Searching Authority has discovered that in the Invitation to pay Additional Fees send on 21 November 2003 the documents mentioned on the extra sheet (D1, D2 etc.) are not explained further and do not correspond with the Search Report.</p> <p>Please find the description of the D documents:</p> <p>D1: Plant and Cell Physiology 41:1229-1234 (2000) D2: Plant Physiol. 111:1177-1181 (1996) D3: J. Biol. Chem. 277:16712-16717 (2002) D4: WO 9904013 D5: Plant Cell 14:1417-1432 (2002) D6: WO 02053589</p>		
<p>Name and mailing address of the International Searching Authority</p> <p> European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016</p>		<p>Authorized officer</p> <p>Barbara Klaver</p>

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

DRES. FITZNER, MÜNCH & KLUIN
 Lintorfer Strasse 10
 D-40878 Ratingen
 GERMANY

COMMUNICATION IN CASES FOR WHICH
 NO OTHER FORM IS APPLICABLE

Applicant's or agent's file reference 0000053815	REPLY DUE See paragraph 1 below
International application No. PCT/EP 03/06994	International filing date (day/month/year) 01/07/2003

Applicant

BASF PLANT SCIENCE GMBH

1. ☐ REPLY DUE within _____ ~~XXXX~~ months/days from the above date of mailing



☒ NO REPLY DUE

2. COMMUNICATION:

D7: WO 0063417
 D8: Febs Letters 337:157-160 (1994)

We apologise for the inconvenience.

Yours sincerely,

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Barbara Klaver 
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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To: FITZNER, Uwe DRES. FITZNER, MÜNCH & KLUIN Lintorfer Strasse 10 D-40878 Ratingen ALLEMAGNE		B'arb.: <u>FI</u> 25. März 2004 VFrist: <u>25.04.04</u> Vf: <u>SKILL</u>	WRITTEN OPINION (PCT Rule 66) Date of mailing (day/month/year) 25/03/2004
Applicant's or agent's file reference BASF/NAE1003/01 PCT		REPLY DUE within 2 / 00 months/days from the above date of mailing	
International application No. PCT/EP03/06994	International filing date (day/month/year) 01/07/2003	Priority date (day/month/year) 07/08/2002	
International Patent Classification (IPC) or both national classification and IPC C12N15/82			
Applicant BASF PLANT SCIENCE GMBH et al.			

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

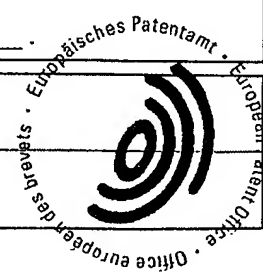
How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
 For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
 For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 07/12/2004

Name and mailing address of the IPEA/ European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Netherlands Tel.: (+ 31-70) 340-2040 Fax: (+ 31-70) 340-3016	Authorized officer Examiner Formalities officer (incl. extension of time limits) Tel. (+ 49-89) 2399 2828
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I. Basis of the opinion

The basis of this written opinion is the application as originally filed.

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The question of whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable has not been and will not be the subject of the international preliminary examination in respect of the claims which have not been searched (Article 17(2)(a) or (3) and Rule 66.1(e) PCT; see also international search report).

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability

1. To the extent that the international preliminary examination has been carried out (see item III above), the following is pointed out:
2. In light of the documents cited in the international search report, it is considered that the invention as defined in at least some of the claims, which have been the subject of an international search report, does not appear to meet the criteria mentioned in Article 33(1) PCT, i.e. does not appear to be novel and/or to involve an inventive step (see international search report, in particular the documents cited X and/or Y and corresponding claim references).
3. If amendments are filed, the applicant should comply with the requirements of Rule 66.8 PCT and indicate the basis of the amendments in the documents of the application as originally filed (Article 34 (2) (b) PCT) otherwise these amendments may not be taken into consideration for the establishment of the international preliminary examination report. The attention of the applicant is drawn to the fact that if the application contains an unnecessary plurality of independent claims, no examination of any of the claims will be carried out.

NB: Should the applicant decide to request detailed substantive examination, then an international preliminary examination report will normally be established directly. Exceptionally the examiner may draw up a second written opinion, should this be explicitly requested.